

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

NOVEMBER 12, 1951

50 CENTS

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HAVING successfully completed test requirements for landing and take-off in the 240 mph speed range, Goodyear high-pressure airplane tires for jet aircraft are currently under test at 250 mph on the new dynamometer at Wright Air Development Center of the U.S. Air Force.

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The new 250 mph dynamometer at Wright Field shown here with Goodyear Rib All-Weather Tread 1 test for use on high-speed aircraft.

Illustration
by
Globe

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Aviation Week

Volume 55

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Crazy with the heat!

Rotor and electrical equipment on supersonic airplanes
goes haywire unless cooled to "livable" temperatures!

"Make it smaller" was the plea of aircraft builders to the radio and electrical manufacturers.

So they did. Electronic tubes came down to "pocket" size, and the little black boxes housing equipment to operate guns, bomb sights, cameras, navigation and communications devices became smaller and smaller.

But no one dreamed, imperiously, around! It was found that, at high speeds and altitudes, rotor and electrical equipment went haywire. The only answer was to cool this equipment, in the same manner cockpit seats are cooled for pilots.

AirResearch—world's most experienced concern in aircraft pressurization and air conditioning—went to

work. Today ways are being pioneered here to cool the little black boxes. Black means to be uncool—hot! Work that calls for close cooperation between AirResearch and the makers of airborne engine, rotor and electronic equipment.

AirResearch has the skilled engineers, laboratory, testing and manufacturing facilities, and the "know how" gained through 12 years of solving problems in the refrigeration and pressurizing of aircraft. That's why nearly every post-war airplane is AirResearch equipped!

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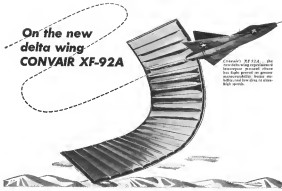
AirResearch—specializes in the design and manufacture of aircraft refrigeration equipment—is a leader in the following major categories:

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AirResearch Manufacturing Company, Dept. E-12, Los Angeles 45, California

On the new delta wing CONVAIR XF-92A

Convair's XF-92A, the two-seater wing experiment, is being prepared for its first flight. The aircraft is being built at Convair's plant in Fort Worth, Texas.



J-M THERMOFLEX BLANKETS insulate against the searing heat generated by jet power



ThermoFlex blanket being applied to a jet engine exhaust cone. Special grooving allows protection to extend cylindrical and conical surfaces... and allows the expansion of metal as temperatures rise.



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AV-1A is a trade name.



Johns-Manville

**PRODUCTS for the
AVIATION INDUSTRY**

NEWS DIGEST

DOMESTIC

Air Line Pilots Ass'n's executive board has recommended that its attorneys extend suit against dependents of David L. Belasco to include damages allegedly suffered because of his action against ALPA. The board also set up machinery to get a second-hand bill from airlines following the result of Belasco and the election of Clarence Sayan as new president.

Pacific Southwest Airlines' DC-1 crash landed shortly after takeoff from Lockheed Air Terminal, Burbank, on Oct. 31. The 18 aboard reportedly were only shaken up. Mailbag was attributed to engine failure.

Edwin White, 69, Northwest Airlines director and investment banker, was fatally injured in an automobile accident Oct. 22 near Prescott, Wis. White became a member of NWA's board in 1958.

LA, Calif. Wilbur Fay will soon be transferred from the Navy's Office of Information, Washington, D. C., to new duty in Pacific Fleet Headquarters, Pearl Harbor. Fay now will be killed by Lt. Col. David, former Washington Star reporter.

World speed record for 100 kilometers (61.6 miles) set by Col. Paul J. Azusa in a North American F-8SE Sabre put price to the Detroit 1951 National Air Races, has received Federation Aeromarine Internationale approval.

Tacoma, Ala. Lines' Martin 2-2 crashed Nov. 5 while attempting an unbraked landing at Tusconville Airport, N. M. Claimed by the Army to have been, victims from Oklahoma, Calif., to Indianapolis, Pa., and Ft. Davis, Miss., the 2-2 reportedly was forced into Tacoma because of bad weather, but not of a runway. Of the 10 passengers and crew of plane, one died and nine were reported injured.

Leslie E. E. Neville, release editor, editor, author and mail recently with Curtis Wright's public relations executive staff, has been named director of the new Annual Services Technical Information Agency with temporary office in the Pentagon. Neville was chief editor of Aviation Magazine prior to 1947.

CAA has ordered 35 Macgachad 4-wheel jet turboprops, 25 playbacks and 25 waste units for maintenance in

the 25 airport towers in the U.S. and during the heaviest traffic. Deliveries start in January.

Ten Convair Lance 140s have been ordered by Chicago & Southern Air Lines, bringing Convair's firm order for the 41 passenger transport to 113, plus approximately 180 military T-29 navigation trainers.

USAF Public Information Officers in the field are being "pushed" to reduce the number of long-distance AF telephone calls. Congress voted about \$20 million for PBO, with the Defense Dept. and individual services.

FINANCIAL

Boeing Aircraft Corp. has voted a quarterly dividend of 20 cents a share on its 1955-56 shares of common stock, payable Nov. 21 to holders of record Nov. 15. Boeing total sales for the fiscal year just ended were over \$12 million and backlog is well over \$180 million.

Convair Aircraft Co. has voted a 40 cent-per-share dividend on its 700,000 shares of common stock to be paid Dec. 14 to holders of record on Dec. 4, marking a doubling of the company's dividend for the year. This is the fourth consecutive year company has paid a cash dividend. Convair sales for fiscal 1951 were \$16.5 million, its backlog is over \$50 million.

Chicago & Southern Air Lines had net profits of \$174,016 after taxes for the first nine months of 1951, a 123% gain over the corresponding period last year.

Piedmont Airlines reports passenger revenues for September of \$114,626, a 40% increase over September, 1950.

Mid-Continent Airlines has declared a 25-cent dividend payable Dec. 21 to holders of record as of Dec. 10.

United Air Lines reports a third-quarter net profit of \$1,754,701, compared with \$4,294,256 for the same period last year. Net assets net profit was \$6,744,512, compared with \$4,174,926 a year ago.

INTERNATIONAL

G. W. G. McCord has been elected president of the Air Industries and Transport Ass'n of Canada. McCord is vice president with C. H. Dickson and T. F. Fox. New secretary is M. E. Ashton, treasurer is A. Burch.

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AVIATION DIVISION
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WHO'S WHERE

In the Front Office

J. Nelson Kelly has been promoted to executive vice president of **Boots Aircraft** Inc. Corp., Franklin, Conn. With Boots since 1946, Kelly is a veteran pilot of both World War and at one time was in an anti-aircraft unit with United States Army.

Frederic S. (Doc) Doyle has been named executive assistant to the president of **Gradyne Company of America, Inc.**, St. James, L. I., N. Y. He is former production design head with Cessna-Wright in Columbus and Buffalo.

Wm. A. Cowell, former assistant general manager, has been appointed vice president operations of **Kaiser-Frazer Corp.** He has been with K-F since 1946.

B. H. Andrews has been promoted to vice president sales and contracts of **Pacific Airplane Corp.**, Berkeley, Calif. Andrews formerly was PACC's vice president Eastern Division. He joined company in 1948.

Bernard W. Frank, a director and vice president of **Both & Co., Inc.**, has been named a member of the board of directors of **Helio Helicopters, Palo Alto, Calif.**

Joseph A. Grodin, former plant superintendent at **North American Aviation's** Long Beach facility, has been appointed corporate manufacturing for **American Helicopter Co. Inc.**, Manhattan Beach, Calif., plant.

Frank Kuntzschert has been appointed administrative assistant for **The Flying Tiger Line, Burbank, Calif.**, succeeding **W. R. Lewis**, who stepped to join **Overs National Airlines, Honolulu.** Kuntzschert has been in charge of the company's customer service department.

Changes and Promotions

Charles D. McGill has succeeded **Frank L. Miller** as general sales manager of **Gen and Motor, New Departure Division, Bristol, Conn.** Miller resigned because of ill health. McGill is former manager of the division's regional sales office, Detroit.

Kenneth E. Allen has joined **The Curtiss Corp.** as assistant manager for the company's **Aloha Airways** division. He is former public relations director for Western Airlines and previously held similar position with **Continental Air Lines.** **Arthur J. Fitch** has been named manager of engineering at **Curtiss's Aloha Airways** division, managing company at **Honolulu, Fla.** Fitch formerly held engineering positions with **Chrysler Corp.** and **Northrop Aircraft Inc.**

John Hopkins is new flight manager promoted to **United Air Lines** with headquarters at **Denver**. He joined UAL as captain in 1951 and has been serving as assistant flight manager at Seattle.

Honors

Jon T. Trapp, president of **Tim Allen** on World Airways, has been awarded the **American Legion's** medal of meritorious service for cooperating with the Legion's "Tide of Toys" activities in 1951.

INDUSTRY OBSERVER

► First estimated rollout date for the eight-**jet Boeing XB-52** bomber at Seattle is about Nov. 30. Plans will undergo extensive ground and taxi tests before its first test flight early next year. Whether the plane will be demonstrated officially to the public and press on rollout is not yet decided. It is being deferred because of a reported death of **Air Force Secretary, T. K. Whitsett**, to keep the huge rollout under security veil. However, a heavily traveled highway separates Boeing plant from its airfield and the noise level from the eight Pratt & Whitney J-57 jet engines of 5,500-hp thrust each, attracts plenty of attention from passing motorists.

► Tipoff to the speed range of the **North B-64 Mustang** pistonless bomber is in photographic release showing the B-61 in straight and level flight being chased by a T-33 and a Republic F-84 fighters. The fairly obvious confusion to be drawn is that the USAF would not stage chase planes which were hopelessly outpaced by the missile. F-84 top speed is known to be at least 650 mph.

► The new **General Electric T-35** turbojet engine will be the redesigned J-47GE-33, and not the J-35GE-21 as previously reported.

► **Cessna Aircraft Co.** is keeping tight reins on two new plane models: 180 and 210, for which it has requested materials allocated late in 1952 and in 1953. Both still are in very early development stage, and the Wichita company is withholding details until much nearer the time of actual production. Only key to the planes beyond the model numbers is the fact that both are to be powered by **Cessna's B-315-C** engines with **Hirth's HC123C** propellers.

► **NACA** is developing a helicopter rotor speed recorder at **Langley Laboratory, Va.**, which is expected to be a valuable adjunct in extending service life of rotor mechanisms. It will be used later in tests in which **Los Angeles Airways** will cooperate with **CNA, CAR** and **NACA**.

► New contract with **Kaman Aircraft Corp.**, for installation of the present used Boeing gas turbine of approximately 200 hp, as a helicopter, is being carried out on one of the K-125 ships which **Kaman** first built for the Navy, for but at **Textron's** **Copier** has been returned to **Kaman** for the new powerplant installation.

► **Bell Aircraft's** new Navy subchaser helicopter, designated **NRH-1**, is nearing completion at Buffalo and will be shipped to the new **Bell helicopter plant** at Ft. Worth for its first flight there shortly after the first of the year. The three-ton craft, powered by a Pratt & Whitney T-2800 engine with 2,400 hp, for tailrotor, incorporates overlapping tandem rotors of the Bell rigid two-blade variety, with automatic stabilizer bar, and has quadricycle landing gear. It recently was declared that a two-seater equivalent at the minute cost could carry 20 passengers and cruise at 120 mph.

► **John R. Loh** of **England** is negotiating the lease of **Northrop T-37** and **Curtis D-12** has started to build at **Montreal** for the **Royal Canadian Air Force** under license. Rohn has optioned a plant site near **Montreal** and has local architect and industrial engineers in preparation for construction of a 325,000-sq-ft engine plant, **Montreal** reports say. **Chrysler Canadian** facility now operated by **Bell-Royce** is a launch engine overhaul plant at **Dorval Airport, Montreal**.

► **Allison division, General Motors**, has quietly taken the reins on the latest production version of its T-38 turbojet engine to 3,000-shp, from the 2,750-shp driven for the original XT-38. And the end is not in sight. Last versions of the T-38 are expected to develop up to around 3,750-shp. The 3,000-shp T-38s are now certified as the **Cessna Terrier** which continues testing at **Edwards AFB, Merced, Calif.**, and are scheduled to go into the three **Cessna T-29** navigation trainers with turbojet power, recently ordered by USAF.

143-Wing USAF: When?

A 143-wing Air Force program now seems to be a sure thing—right?

The President has given his nod to this buildup beyond the current 95 wing goal. And Air Force is now making to make estimates for the Budget Bureau so that the program can be spelled out accurately in the President's 1955 fiscal year budget message, due for submission to Congress before Jan. 15.

As far as funds go, this means:

- A boost from the \$22 billion already voted to USAF for the current '52 fiscal year to approximately \$26 billion. The \$4 billion increase will be primarily for base and personnel.

- An outlay of approximately \$30 billion for the '53 fiscal year starting next July and achievement of the full 143-wing strength by the end of the fiscal year, as mid 1955.

- Level-off at around \$22 billion a year to sustain the 143-wing strength.

Of the six additional wings, the lion's share—probably around 25—will be tactical air wings. The emphasis on the remainder will be on air defense wings, meaning only a slight build-up in the strategic air arm.

For tactical manufacturers this means another round of contracts, possibly more direct public orders and stock selling, largely for tactical fighters and bombers and interceptors.

The fast-appropriating and cost-plus-fee, though, will give the U.S. just a paper 143-wing USAF, unless positive additional steps are taken.

If the bigger Air Force is to be in being by USAF's goal of mid-1955, output must be speeded—which means a bigger bite of materials for gear, less for better.

Policy on this is up to Defense Mobilization Director Charles Wilson and the President. They will weigh the economic and political impact of cutting back on working machines and automobiles. And these cost-cutting actions are likely to weigh heavily in these current election year.

The heart of the matter no longer seems to be "whether" there is to be a 143-wing Air Force program, but "when" there is to be a 143-wing Air Force. The Administration still has to decide on that one.

The New Door to Warfare

Top defense chiefs view the atomic-powered plane as "the missing piece" in the victrolite.

One estimate: "If the nuclear-powered airplane were not, we are safe one step away from the missile."

Strategic warfare apparently was the "atomic warhead" mission had in mind when after conferences with defense chiefs, they currently talked of "scientific and technological advances, particularly in the field of defense, opening a new door of scientific warfare not even envisaged in World War II."

These observations got lost in a bit of talk about "future" new weapons in the fields of chemical, bio, atomic and guided missile warfare being studied for battlefield use. This despite the fact that the reaction returned only to a new "door," not a new weapon, explicitly said they didn't intend to develop, gear, stock or guided missile weapons.

The low Secretary of Defense James Forrestal estimated 200 to 400 outcrops base, making the earth,

with weapons to be launched from earth controls, as the ultimate in defense.

- The fundamental barrier to the project.

- Penetration and lead to drive the satellite beyond the sphere of gravity.

- Navigation control of the weapons stored on the satellite for sure-fire decision to earth targets.

- On the prospects for the nuclear-powered plane.

- Gordon Dean, Atomic Energy Commission's Chairman: "I think in the next decade you will probably have a place in the sun, the power for which comes from a reactor."

- Sen. Brian McMahon, chairman of the Joint Congressional Atomic Energy Committee: "In peacetime in atomic energy, and almost Navy, and an atomic Air Force, I deliberately avoided any reference to the nuclear-powered aircraft. Such an aircraft, I believe, is feasible. It will become a reality in the future. But it is not sufficiently immediate—not near enough on the horizon—to be included in the program."

- A top USAF research and development spokesman: "In four to seven years, we'll know whether the atomic plane is feasible."

- Dr. Harold Urey, top atomic scientist and consultant to AEC director: "Atomic planes aren't important in the long run. You have to carry your own nuclear material in them. That is a job the Air Force is busy working on. They get like small children when it comes to this sort of thing. . . . You're not going to put (reactors) in automobiles either."

Small Lines' Big Problem

Government financing of a reactor plane for local service operations is out for the foreseeable future.

And Civil Aeronautics Board's Chairman, Donald Noyce, has been saying can't continue to pump for the project—officially, at least.

In a letter to Senate Interstate and Foreign Commerce Committee's chairman, Sen. Edwin Johnson, Noyce had recently urged legislation authorizing \$5 million for development of a local plane.

It's the answer, he argued, to the problem facing the local carrier and the Board, in its effort to promote "a well-rounded air transportation system."

Then the Budget Bureau dropped down and Noyce wrote Johnson indicating his abandonment of the legislation, explained he had been informed "it is not in accord with the program of the President."

The Board doesn't want to give the carriers permanent certificates, wants to "retain flexibility of route pattern" and because the carriers haven't got permanent credit rates, banks and aircraft manufacturers won't finance a suitable short-term plan. The market may have disappeared before the plane comes off the production line.

So, the local line has the problem of proving an economic operation with economic equipment.

Noyce had also urged development of a helicopter for local service—a plan advocated by Sen. Harley Kilgore, chairman of the post office appropriations subcommittee.

Kilgore's view: "Disabling the country with helicopter services feeding into big trucking points in the early years to a small air transportation system. Since helicopters can operate in one direction, it would not do much better for expensive airports."

—Katherine Johnson



COMMON SCENE IN KOREA, a helicopter saving the troops, has increased the public's hopes of a great commercial future.

Copter Firms Reveal Commercial Plans

- Military production now is taking all facilities and materials, so immediate civil output not in cards.
- But manufacturers, heartened by utility proved on battlefield, are getting future civil programs ready.
- Right now, Los Angeles Airways will be the guinea pig on developing copter passenger transport.

By Alexander McCondy

Most U.S. helicopter manufacturers predict a very commercial future for their versatile air vehicles, at least as they can take care of the growing military demand for rotary wing aircraft as a variety of uses and performance is required.

But producer of immediate military demands for 800 copters at an expenditure of over \$200 million for fiscal 1952 is such that only a very few commercial helicopters probably will be produced in the near future, even if materials can be made available, which is doubtful.

A recent report of personnel drawn for

civil aircraft, presented by federal civil aviation district agencies, called for materials to build only these types of civil helicopters.

- Sikorski, Two S-55 helicopters, as ordered by Los Angeles Airways.

- McDonnell Aircraft, Little Huey Model 79 cargo helicopter, for carrying work, scheduled to be produced at the rate of 32 a month, beginning next spring.

- Bell Model 47D1 small helicopter for crop-dusting, scheduled to continue in production at the rate of one to two machines a month.

An Aviation Week survey among the principal helicopter manufacturers

in this country discloses no other helicopter scheduled for early commercial production. But, in the near future, prospects are bright for commercial versions of several other helicopters in state making up to 40-passenger capacity.

- Census Bureau-McDonnell federal civil aviation agencies appear to have settled on the plan of making Los Angeles Airways their principal guinea pig for commercial helicopter route development work and development of instrument flying, helicopter, and other passengers to larger civil passenger transporters by copter.

The New York state helicopter route case which has been pending before CAB for more than a year is still hanging fire, with prospects dim for an early decision between the two applicants.

Some observers predicted that the uncertain atmosphere surrounding the case indicated that the Board was not ready to favor either applicant, but would hold up the entire development, on the grounds of higher safety survey for equipment.

• Safety Experience—Noted directly by



IN THE FUTURE, civil version of Piasecki's XH-19 may be cargo carrier, and so on.



DISTANT FUTURE, Hughes' Model 203 may carry 70 passengers. But the only...



PRESENT big copter that will see commercial service as S-55, now the AF H-29A

Aviation Week when a decision might be forthcoming. CAR Chairman Donald W. Niswag agreed with an indication, "pretty soon now."

Conservative attitudes of CAA and CAR toward single engine equipment for passenger operations is expected to be loosened over to helicopter equipment. These last year's plans requirements. It appeared likely that a two-engine copter with sub single-engine performance would be about a prerequisite for any large scale passenger operations.

Good safety experience with the single engine Sikorsky S-55 in first stage operations, plus the ability of any commercially acceptable copter to set down safely with auto-rotation, may modify such a requirement.

Most likely big copter project for commercial conversion is the Piasecki XH-19 which is nearing completion but several months from first flight.

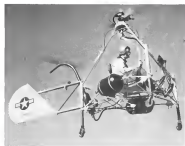
This craft has a fuselage the size of a DC-4, and an one long-legged landing gear version, will be capable of suspending a detachable pod for cargo under its fuselage. Piasecki spokesmen are reticent about definite commercial prospects for the craft at the moment, may say, but are undeniably hopeful. And if it can do the military job for which it is designed, it could do an equally important job in commercial use, expediting passengers or high priority cargo over short distances in a time fraction of time now used by surface transportation, they pointed out.

Not Commercial-Chances for a commercial development, starting from the big Hughes at mid-XH-17 copter appear less promising. An earlier study on a commercial version of somewhat smaller craft, which could hold 70 passengers in a double deck fuselage and about 200 sq ft of 500 sq ft, was sent by Hughes Aircraft to the CAA as background for a recent general helicopter study.

But a Hughes spokesman said that the Model 203 is not projected for consideration in a commercial craft at the present time and that the manufacturer is concentrating on its military work. Principal Hughes engine development now in progress is the XH-17 into a full-fledged freight vehicle.

Here is a roundup of other personal helicopter manufacturers and their main products which may have later commercial applications:

• **Sikorsky.** In addition to the Model S-55 which carries up to 10 persons, and which is the commercial counterpart of the H-19A, recent transport copter already in use in Korea, Sikorsky has under development a larger two-engine model transport with variable fuselage interior configuration, with a cabin of approximately DC-3 size. On



LITTLE HUMPTY, McDonnell's major craft is expected to see widespread market

the basis of recent reports from manufacturers, it appears that the S-55 will have the larger commercial copter field undisputed for at least the next year after the first model is delivered to LAA this month.

• **Bell.** When the new sub-subscale helicopter XH-19 flies down at Bell's camp 71, Warth helicopter division, early next year, it is expected to be a likely candidate for commercial transport conversion. Henry Garfield, Bell's vice-president in charge of the helicopter division, recently described it as a three-ton helicopter capable of carrying 20 at speeds close to 120 mph.

Competitive with the smaller Sikorsky S-55 is the Bell Model 43 with military designation of H-13, which has 6- to 10 place capacity. Bell originally designed that craft for a commercial version called the "Frederick" (Aviation Week Nov. 7, 1964, p. 42) but has never produced a commercial version. Bell has had a small but steady sale of its little Model 47s for agricultural work and presumably will continue to produce that commercially, or a successor in about the same size.

• **Piasecki.** The relative newcomer Piasecki has tight military orders for two sizes of transport helicopters, the H-21 which can carry up to 20 passengers as a transport version, and the H-29, a smaller version which would be able to carry about six in a non-commercial version. These two machines both have future commercial promise, especially the latter one. A third string for the Piasecki future commercial line, of course, the prospect of a commercial adoption of the XH-19 previously discussed.

• **McDonnell.** A sub-scale version McDonnell helicopters in the 4-13 weight range of the most popular Little Humpy are the principal bids of McDonnell Aircraft for the helicopter future. No intention is offered as to what commercial planning is done for any other McDonnell models besides the Little Humpy competitor.

• **Hiller.** The most powerful Miller Helicopters, announced in a two-place commercial craft but held up by pressure of military contracts, presumably will be the first Miller bid for commercial business, and there is little intention as to what progress of this or commercial copter into larger commercial craft are contemplated at this time. Minneapolis Hiller's conventional H-23 copter are being produced for Army and Navy.

• **Kaman.** A recent Navy contract for Kaman to build the model Bering but late as an experimental powerplant as a helicopter is being worked with patient and may eventually lead to more widespread use of the small business Kaman also has Navy production contracts.

• **Donner.** The little-known Donner Engineering, of Danbury, Conn., entered with a design, known as the Pelican, of a seven-place machine, went on to select it as a three model built for Curtiss-Wright, and now has a contract and definite work under construction for the Army.

• **McCulloch.** Moten Another newcomer in the helicopter field, McCulloch's helicopter division, has a small Navy contract evaluation of its tandem rotor craft, presumably in a transport. Its commercial future has not been spelled out.

Northrop Doubles 1950 Gross Income

After showing a loss for several years, Northrop Aircraft staged a comeback into black ink for fiscal year ended July 31, showing a net profit of \$5,776,012.94, after taxes, on gross income of \$94,947,624.13, versus the double-digit fiscal year 1950 totals of \$43,311,364.79.

No federal excess profits taxes were charged against the 1951 income, since a portion of previous losses incurred was allowed.

During the year, the company's backlog went to \$100 million, highest in Northrop history; in July 31 it stood at \$75 million. Major product at present is the two-seat, six-engine F-8H Scorpion jet fighter for the USAF, a few quantities of which already are operational.

Northrop's employment last year considerably bettered 1950, with 14,590 men on the rolls.

Increased activity in the company's Special Weapons division contributed heavily to a rising trend in fixed orders at the USAF Long Range Penetration Command, Patrick AFB, Calif. Northrop also operates a test range installation at Holloman AFB, Alamogordo, N. M.

Among the firm's other activities is its Analysis facility which will soon set optical maps for Army tanks. A 250,000 sq ft. building is under construction there. The Northrop Aircraft division is operating at capacity, training 1,300 students and several thousand USAF personnel in aircraft repair.

How Effective Is Small Business Aid?

Durham—A special committee of subcommittee under Wright Patterson AFSCME last year set out to determine effectiveness of the program to aid small business firms whose employees fewer than 500 persons.

The group was appointed in one of the last acts of John A. McCone, since Undersecretary for Air and was accompanied to Durham by Kenneth Weddel, chief of the Office of Small Business, Deputy Chief of Staff, Material.

Members of the group include Loren Rutherford, chairman, Servco Corp.; Glen McDowell, president, Radio and Television Manufacturers Assn.; Howard Williams, president, Washington Field Associates Co. and head of the New England Small Business Assn. and A. D. Fiamonico, Jr., president, Industrial Steel Products.

Civil Non-Carrier Aircraft Quotas—C-4 Program

[illegible]

How Many Civil Non-Carrier Craft?

DPA Schedule C-4 sets quotas: 3,375 this year and 3,644 in 1953; but program is subject to revision.

- ◆ **Bellows.** 170 Bellows at four a month
- ◆ **Calf.** 90 Calf A-1 agricultural plow at one a month.
- ◆ **Comas.** 1,218 Comas 170s at 68

DFA is scheduling production of 3,375 civil planes and copiers next year

and 3,644 in 1993, compared with only 2,852 this year. But these school closures still make them accounted for

• 720 of the new Census 1990s starting in production in fall, 1992, come to

of the program is light aircraft production, Avco Aircraft Corp., Mid-

stret production last quarter of 1953

► McDonnell, 234 compact Little Hawk helicopters, starting production the

tracts. Limited manufacture of Airvac
quads will be continued.

• **Secondly**, 74 M100s with Cos-tronatal engine, going to two a month next year and three a month there-

- 74 M18-La with Lycoming engine

► **Piper** 1/688 Super Cobra, rising from around \$2.5 a month to a steady \$3.50 on equal schedule.

5,500-aircraft rate for which DPA says it will grant controlled automatic and

- 1,311 Pairs at 43 a month.
- August: 231 four place tickets, rising

has been caused "by the intermarket natural gas shortages during the first half of 1977" and the steel industry to meet a month's worth of new year and hoping to shoot over a month's cost of \$254.

► **Tyloscraft.** 252 two-place T19s sit idle a month.

granted materials to start the schedules shown in table, p. 16) for the first year.

included in the DNA-annotated

quitas are 15 different types of landing plane, a conventional Roll help

changes with less fortunate scenarios turn out from inventory. Also, some manufacturers may not come up to

There are limits on DOT-approved production quotas for each type of civil aircraft for the 24-year period from

September of this year to March, 1994, totaling 5,693 aircraft for the period.

* Auto Design and Engineering, 250 four-engine Auto Constructors, with production schedule came from for a

How CE Shapes AF

How GE Shares At Jet Engine Dollars

• 299 Twin Boussons, ring from a forest but a month to a steady 12 a

► Bell, 33 helicopters 43 DIs, at one a

match materials and services. The suppliers

are located in 41 states and the District of Columbia.

A report in the Air Force, based on a three-month survey CE mailed covering 2,640 of its suppliers, showed 82% of the vendors fell into the small business category. Of the 2,640 questions sent out, GE received 907 replies—774 from firms employing fewer than 500, and 175 from those with more than 500 workers. In fact, it noted, 429 of the 907 companies reporting said they did business with a total of 49,458 organizations classified as small business and 16,039 large enterprises.

There is some difficulty in consistent reporting of a company's size. For example, a firm may be considered in the small business class prior to receiving a GE contract, but once aware people in GE the size and thereby not of the classification. Aerospace at Middletown, Ohio formerly was in the 501(c)(3)-employee class, but to fill a GE contract for radar screens, employment went to 747.

Extra Power-on Aid to Hovering Copter

(McClure-Hill World News)

San Jose, Costa Rica—An interesting operational track of the trade for helicopter operation and one that must be taken the back out the window was involved by the crew of a USAF Air Rescue Sikorsky HO4E (551) assigned to help locate a yellow fever epidemic which hit this island recently.

Keeping plenty of power on while hovering, even if it meant overriding the tachometer redline, was a technique pilot Capt. John B. French learned only in the grave. The reason: sudden air currents which disrupted the ground cushion effect and tended to overturn the H-35.

The safe limit is supposed to be 2,100 engine rpm, but Capt. Pearce says he found it necessary to go to 2,600 rpm, to be certain of maintaining a "loose" Once while the captain was loitering, a current took away his ground controls and the copter suddenly tumbled downward, staying in the Merganser nosecone. But with his entire

Captain Pencock also likes the 15-5s performance in heavy air. He never flew above 1,750 ft during the whole spywing operation, staying mostly between 100-750 ft above ground.

He thought, however, that pilot visibility, straight downwind on the 115 left a lot to be desired. The pilot sits in the rear seat and therefore cannot get a vertical view of the ground while landing. But, later Slindeyis was overruled by the dispatchers, he said.

How GE Shares AF Jet Engine Dollars

Sixty cents of every dollar General Electric received from the USAF for jet engines during the past year went to its 4,370 suppliers for components, materials and services. The number

Planes on Loan

• **AF, Navy come to aid of suppliers with 344 craft for use in public interest.**

• **Airlines also may borrow units for cargo purposes under leasing policies.**

U.S. Air Force and Navy have 344 airplanes loaned out to various manufacturers, researchers, airlines and other companies for experimental and other use in the public interest, figures just released to *Airman's Week* revealed.

Planes now on loan, including 195 USAF aircraft and 47 Navy planes, are estimated to be sufficient to provide an lift for seven troop carrier groups.

While at first glance this seems a very large number of plane take from military supply, they provide many worthwhile services. And a number of the planes on loan are obsolescent types which would not be in use otherwise, and probably would be scrapped.

• **Five N44s, B-44s.** For example, said main engine manufacturers operate World War II bomber flying test beds in aerial platforms from which to test their new experimental jet engines. Pratt & Whitney Aircraft design, for instance, is testing a high priority flight test program on its new J-57 and low thrust jet engine, possibly the most powerful as the new generation of powerplants now in development.

This is accomplished by suspending the jet engine from the bomb bay of a Boeing B-29 in flight. Another Pratt & Whitney flight test program uses USAF Boeing B-17 to test the T-34 turboprop engine. This plane mounts the turboprop in the nose in the space formerly occupied by the bomb bay and its equipment.

Other major engine and propeller manufacturers have similar military aircraft engine test beds.

• **Two Type Loane-44.** Four and Navy planes on loan to test units are controlled under two separate type lease and loan policies. Air Force currently has 116 aircraft of all types on loan to civilian users, and the Navy 28. Under terms of the other type agreement USAF is loaning out 139 aircraft and Navy 29.

Air Force and Navy contractors are eligible for military-owned aircraft for test purposes and planes are loaned to provide operation under provisions of Public Law 364, Civil Control Act.

Construction of military aircraft for test of experimental purposes in connection with research, engine, or equip-

ment development work, or projects in the national interest, generally involve them under loan policy.

Private operators such as airlines can lease planes if it is determined the lease would be in the public interest and the aircraft are not needed for immediate military use.

• **Endmost Procedure-Endmost** contracts provide for transfer of planes by the Air Force or the Navy to a contractor if he guarantees that they will be used by him for the benefit of the military service involved. The agreement also sets out terms for return of the plane.

Under this contract, the holder actually is required to furnish fuel, equipment, crew, engineering and maintenance.

Regardless of the plane must be performed in accordance with military regulations. Records, reports and test data must be compiled with. In all cases the contractor agrees that the government has access to the plane at all times and that it will be used only for the agreed test program.

The plane on loan may not be flown outside the continental limits of the United States without specific agree-

ment with the government. The company is liable for loss, damage or destruction of the aircraft due to negligence.

• **Lease Procedure-Under** leased and maintenance contracts the Air Force and Navy also will loan cargo planes under lease agreement to Civil Aeronautics Board-authorized airlines.

Lease agreements set out that the aircraft involved are to be used in connection with authorized cargo operations and that they will not be subjected to the same aircraft as in regard to its use to the military service and that it will be maintained in accordance with CAA specifications and standards.

In addition, the lease is held liable for damage up to a maximum liability established in the lease instrument. Air Force and Navy hold extended operations outside the continental U.S. and the lease agrees that the aircraft will be returned upon demand.

Further, the lease agrees to provide within 45 hours aircraft and crew to perform Air Force missions as well as with military aircraft contracts which would be negotiated at a later time if required to meet military requirement.

Steel Slash Kills Building Plans

U.S. steel and joint military-civilian ship and construction plans are being forced to make radical changes in building plans for hospitals, government buildings, airport towers and terminal buildings. Reasons a Civil Defense Production Administration has slashed steel and aluminum allocations for the fourth quarter of this year and is expected to continue cutting them back.

CAA claimed requirements of 29,729 tons of carbon steel for civil and defense building for January-March, 1952. Of that, 17,186 tons was structural. The allocation request was meeting DPA action but work. Outlook is that the steel supply situation will remain tough all over next year.

So some programs are shelved, others deferred, while architects redesign structures to use less steel, especially structural steel. Most civil aviation buildings are now going from structural steel to reinforced concrete, masonry block and wood construction.

• **Cutback effect-CAA** estimated civil aviation construction would need 5,000 tons of carbon steel for construction for the October-December period this year, 1,250 tons being structural steel, DPA allocated 6,130 tons, including only 1,800 tons structural.

Here are five examples of what happened when CAA had to allocate its reduced steel allotment to projects with highest importance.

• **Dallas.** Big new control tower planned, with radar and communication to take care of increased Air Force and Army diving and increased airline traffic, required 451 tons. 14 tons of it structural. CAA asked Dallas to turn down the whole project.

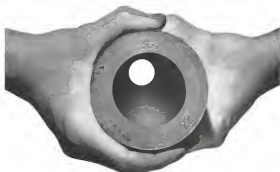
• **Boston.** Central tower, weather bureau, CAA construction and control office and facilities, terminal building, airline office and passenger space required 81 tons of steel. Steel was denied, although Department is the growing center of one of the world's largest oil refining districts.

• **Midland, Tex.** Control tower mostly for Air Force traffic, requires 494 tons. All action was denied although there is no intent there, same.

• **Miami.** National Airlines needs a new maintenance building, too, as traffic is already up 50% and new equipment is on order. Maintenance facility would require 194 tons of steel. 567 tons of it structural, but the steel was denied.

• **San Francisco.** United Air Lines saw the steel shortage coming some time ago and completely redesigned its SF maintenance base program, cutting its structural steel requirements for the fourth quarter from 550 tons to 214 tons of structural steel. But the application was nevertheless denied for all 214 tons. United's heavy expansion is important to any Pacific airfield build up. All the above plans are now being applied by CAA to DPA.

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NACA Seeks Answers to Mach 3.5 Speeds



ANALOG computer which calculates interaction of jet-engine variables, and...



NEW 55-SEAL, seven-stage, 87,000 hp compressor for supersonic windtunnel.

• New tunnel will test 100,000-lb. thrust ramjets.

• But problem is present efficiency losses.

By Irving Stone

Three phases of concentrated research are being started at the National Advisory Committee for Aeronautics' Lewis Flight Propulsion Laboratory to cover that U. S. engine program will meet by these fields of research are:

- Long-range programs which will be first in three years.
- Shorter-range investigations for applying results in production airplanes in the next few years.
- Immediate studies aimed at current problems.

NACA is taking propulsive forces, based on data experimental research and transferring the integrated findings into sound engineering applications for today's and tomorrow's high-speed planes and missiles. One specific division of the laboratory's programs is the entire down of time normally required for learning on video into fact. What formerly might take a year for this translation is now a matter of weeks.

• Largest Tunnel Since—The potential of the Lewis Lab's efforts was indicated by one research highlight announced at a press conference following the



RAMJET engine for missile is tested in world's largest windtunnel.



TWIN-JET exhaust structure is tested for simulated takeoff.

close of a recent inspection tour of the Cleveland facilities by some than 1,200 representatives of the aviation industry, the military, executives and the press (Aeronautics News Oct. 22, p. 34).

That is a new, important feature, costing \$14 million and being pushed for completion next summer. It will be the world's largest, even exceeding the capabilities of the laboratory's present 5 x 8-ft. testing facility. It will accommodate large-diameter, long-range ram jets developing well over 100,000 lb. thrust (more than 5,000 lb./sq. ft. of frontal area) at Mach 3.5 at 45,000 ft.

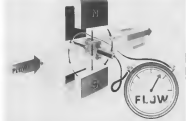
Meanwhile, Lewis Lab engineers are using the 5 x 8-ft. tunnel to conduct repeated preliminary problems of missiles and aircraft at speeds up to Mach 2. One of the problems under study is the relationship between engine thrust and inlet pressure loss. How much can be a pointed up by the fact that a 25% pressure loss between the frontzone and the combustion chamber inlet will result in a 15% thrust reduction.

Like Stodola-Sacco pressure losses are to be expected, but NACA has tackled the inlet problem and has come up with data for an intake design that will allow good engine thrust at twice some speed—out zero angle of attack. But with change in angle of attack, the pressure-thrust relationship is altered. Thus, if a missile's angle of attack is increased to 25%, pressure losses could be sufficiently substantial to cause a drop in thrust to 75% of engine power at zero angle of attack.

Another aggravating factor affecting engine location is caused by placement of the horizontal controls on the rear of the missile to avoid effects of wing



ALTITUDE TANK where stacking and opening characteristics of jets are studied and...



ELECTRONIC flow meter which measures flow outside the inlet at flow within combustor.



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under and pulping heat conditions. The Bureau of the controls during an engine tests up the engine supercharger free field. Looking back to the inlet of the burner engine, the resulting disturbances can seriously cut power output.

Another consideration to cut thrust losses with the engine installation into occupied in the middle fuselage is also the removal of boundary layer that flows along the fuselage surface ahead of the inlet. When the burner engine can't be positioned to avoid the boundary layer condition, removal of the layer is necessary.

NACA engineers are looking out the answers for the best compromise in a fixed removal system and also are working on an adjustable scoop that allows pressure for efficient layer removal. This is an arrangement with a movable ramp ahead of the inlet with bleed air of the inlet for dumping the low-energy air overhead. The scoop is now adjustable for a specific thrust condition, but the NACA research scientist said that the aim is to make the operation automatic to accommodate data various flight conditions.

► **Air-Cooled Thermocouple** — In NACA's propulsion research, new instruments constantly are being devised to keep pace with changing operating conditions. And special equipment is required for rapid reduction to suitable form of the tremendous quantity of test data recorded.

For example, the conventional thermocouple's lag is too great to cope with rapidly fluctuating temperature changes, it is not sufficiently rugged, and its limiting operating temperature already has been exceeded in current research.

Increasing the mechanical strength of the wire alone boosts the response lag, so NACA has solved the problem by introducing an electrical lag compensation, thus making it possible to ruggedize the thermocouple and still get fast, accurate measurements. As a result, the compensation saves the gas temperature ahead of the thermocouple.

To deal with the gas temperature in the higher brackets, as in afterburner research, Lewis Lab technicians have devised a thermocouple cooling scheme. The amount of cooling air, fed to the base of the instrument through barriers to maintain a constant temperature, but and prevent cooling, is carefully measured and with that determines the temperature in the engine can be controlled.

► **Fluid Flow Accuracy**—Unusually can be used is one of the researcher's players in rocket engine operation. It introduces rapid burnout and sudden fuel lines. At best, reliability con-

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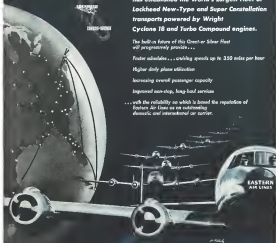
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of a blade section from which a specially developed machine reproduces the desired form in thin metal. Several such sections along the blade are machined in this manner and, assembled in the order of progression, they make up the entire template for the cutter blade.

The silicone has been tested further and the need for templates is now eliminated. Blade dimensions are fed to an electronic tabulator which automatically guides the machining of the blade section, sharply cutting production time. This gives a two-fold increase in output and Lower Lab technicians hope to extend the process to turbine test, so the cutter form can be produced directly from tape in just

Central Control Room—Atlantic is efficient and other test facilities at the Lower Lab are handled by a passivating control control system. Flow, air supplies and engine exhausts are directed for more than 100 test points, many of which are in remote areas. Extent of the operation is indicated by conditions in the 8 x 6 ft. observation tunnel, where (except) USAF jets have been tested to an altitude of 61,000 ft at Mach 2, and rockets have been brought to 30,000 ft.

The "strut" used in the control control room extends along the walls for run determination of the condition at each test point. Laser indicate the mass of piping connections and related lights show whether the run-out facilities are ready for a run, are serving an, or have finished the test. A simple arrangement of switches, meters, and indicator lights complete the control setup.

It represents a masterpiece of service coordination and shows that the complexity of test equipment can be handled by planned, simple controls.

In other fields of research, after advances indicated are associated with... **Advancing** After six years study at the Lower Lab, turbine testing has been brought to a point of use where it will more than double the thrust of the engine at supersonic speeds, with only a slight increase in weight and size of the powerplant. Much work still remains to be done to meet economic and reliability of the afterburner. Cooling of the burner shell is one problem now under study.

Cooling Temperature control for turbine blades and disks, and related improvements, has shown that a 3,800 ft thrust engine can be boosted to a 7,800 ft or higher value. NACA has been working with certain manufacturers for the past two years in turbine cooling and some of these have included the new ideas in their designs (Aerospace Week Oct. 22, p. 16).

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PRODUCTION

AIA Looks to Future Use of Titanium

•Producers ask AMC to undertake 19 projects.

•And know-how for use of 'wonder metal' is one.

By Alexander McIsaac

When titanium—long heralded as the new wonder metal from which tomorrow's airplanes will probably be made—is produced in sufficient quantity to be economically viable, the U.S. aircraft industry wants to be ready with the production know-how to handle it.

Last week, Aircraft Industries Association's cost and cost manufacturing methods committee called upon Air Materiel Command for allotment of 1952 fiscal year Air Force funds for development work on two projects for processing titanium and its alloys, for aircraft and engine parts.

The titanium projects are part of a list of 19 proposed new ways to use aircraft materials to make new high speed aircraft more efficiently.

► **New Methods.** The two projects are not large dollar ones in the total of \$2.5 million to try out new manufacturing processes. But from a long view, they may be the most important on the list.

One, for \$100,000, proposes to try out a method of displacement forming of titanium stripings, at a working temperature of approximately 800 deg. F.

The second would spend \$4,000 for each of five studies on the machining and grinding of five different titanium alloys, on a total of \$20,000.

It is proposed that Natick Aircraft Corp., Chula Vista, Calif., which is already working on titanium forming problems, be assigned the last forming project. It would include developing a means for machining the displacement; developing suitable fixtures for bending flat blanks and portable thermal stamping; means for transferring parts from formers to dies; suitable die materials and laboratory suitable means to test the bending dies; and production of pilot runs of stampings, with aerial impact tests of materials to assure conformance with requirements.

► **End Results.** The machining and grinding projects would be devoted to provide information for development and design of suitable tools with con-

Here Are Proposed Projects

Following are new manufacturing methods projects recommended by Aircraft Industries Association for Air Materiel Command sponsorship:

Automatic wire measuring and cutting machine	\$70,000
Development of production process for hot-forming 7071 titanium and shapes by stretch	75,000
Development of hot-forming titanium stamping	100,000
Hot-forming titanium stamping and inspection	75,000
New techniques for pressure forming	450,000
Machining and grinding of titanium alloys	20,000
Development of machine for trimming parts by high velocity jet stream cutting	50,000
Phase I—design	50,000
Phase II—prototype construction	150,000
Development of production methods to make large-size high quality optical glass	200,000
	\$1,170,000

Following are additional related projects recommended for a second time for AMC sponsorship, since no contract was let for them on last recommendation list year by AIA:

Development of non-destructive weld inspection	\$75,000
Comparison of sheet metal forming processes	14,500
Development of sheet metal forming machine	65,000
Development of long distance measuring machine	100,000
Development of machine for tapering and contour forming of sheet stock simultaneously	100,000
Development of welding techniques for heavy aluminum or titanium	90,000
Development of production method for the quenching	125,000
Development of a pre-welding metallurgical treatment	40,000
Development of a machine for stretch forming tapered sheet	
Phase I—design study	40,000
Phase II—construction program	750,000
	\$1,420,500
Overall total asked for 19 projects	\$2,590,500

Note: The two Phase II projects proposed for \$100,000 and \$750,000 would be deferred to fiscal 1953 funds.

ditions of machining variables such as speed and feed, tool material and geometry, cutting fluids and machine tool position of tool and work. No one was assigned as indicated for the machining and grinding project.

Effort of these two titanium projects and other studies of the material that are currently being made on the behalf of the U.S. aircraft industry are, by far, the most significant of these studies is being emphasized by aircraft industry engineering spokesmen since these findings may guide the industry in cutting up to handle the new material as it comes into more general use.

Aircraft materials experts have been

viewing titanium as a nearly ideal aircraft material, from a weight strength ratio basis, for at least the last decade.

But although it is the fourth most plentiful element on the earth's surface (oxygen, iron and magnesium precede it in that order) one deduction method for quantity production have not been developed until quite recently.

Estimates are that approximately 4,000 tons will be produced in 1952 as compared to approximately 900,000 tons of aluminum which is the first quantity 1952 requirement for element agencies under Controlled Materials Plan.

Titanium can be substituted strength



at BRAD FOOTE is the art and science which converts gear designs into drawings and specifications of component parts. Here . . . in our own plant . . . our own engineers delineate mechanical and metallurgical drawings. Our own draftsmen create the intricate, accurate drawings from which other skilled hands make the finished pieces.

• Engineering is important. It is a primary step in BRAD FOOTE's method of complete manufacturing control. It decides you of gears which will perform satisfactorily . . . what used in your shop or on equipment you sell to others.

• The engineering service we give our customers is another reason why we can say—"No one shares our responsibility."

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Republic, Boeing, and other leading aircraft manufacturers are using many types of Aerotec Automatic Controls in increasing numbers. These controls are custom designed and built to meet specific problems of high speed and high altitude flight as today's aircraft. Each Aerotec automatic device powers dual fuels displacing actual fuel conditions and conserves efficiency and independent safety.

The plans shown above are typical designs that incorporate Aerotec Automatic Controls. The Republic F-84F Thunderbolt, a combat-proven craft, uses Aerotec pressure switches and a new dual fuel switch suitable for tip or pressure mounted auxiliary fuel tanks. Boeing has long used Aerotec valves, fuel switches, and pressure switches in their transport planes.

When you are faced with problems of automatic controls for ships, landing gear and other booster applications, fuel transfer, flow control (vacuum), and automatic Aerotec. One of our representatives specializes in your job, ready to give prompt and able assistance at any time. Call or write.

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Advice to AMC

The U. S. aircraft industry, as sponsored by its manufacturing members' association, has some final policy ideas about how military service funds should be spent on production refinement contracts. Last week, with a list of 16 proposed contract projects, AIAA's committee submitted these ideas to Air Materiel Command. Here are some of the basic points:

• **Manufacturing methods** of AMC should not be used for redesign of a product to improve its productivity, or to develop a production technique for a given design.

• **Fabrication techniques** and designs of a given aircraft type production are an industry heritage and should be an integral part of any supply contract awarded by competition.

• **Government manufacturing methods** should be used for developments in equipment or processes which lead themselves to general application in the industry and should not be involved in or related to proprietary designs or trade processes.

• **Air Force** should not attempt to sponsor separately projects on subjects also sponsored by R&D, AMC, and other joint agencies. Examples: electronics.

• **Military substitution programs** offer slight benefits to the service or to industry. Substitutions must be for specific designs.

• **Funds** should not be spent for improvement of processes or products in a known state of flux that may become obsolete overnight.

• **Military services** should investigate through Phase I procedures as much as possible of potential improvements in production, and consider placing limited orders for construction of machines, recognizing that it takes three years to develop a new machine and several years more to build a limited number of them.

was for most use of stainless steel of which it weighs only 47% as much, in the same volume. And the resistance of titanium to corrosion is another high plus value. These facts together with the large quantities of the material available, are covering the steps of production of the metal and its alloys, along with the studies of its mechanical properties.

► **Parsons Forge**—A project for development of forging techniques and reduction of forging tolerances, which is

The problem was...

How to get extra copies of blueprints—

fast!

A case history based on the experience of the American Brake Shoe Company, Kellogg Division, Rochester, N. Y.



The blueprints (and direct-process prints) submitted by customer placing machining orders used to be a problem for the Kellogg Division, American Brake Shoe Company.

Invariably, prompt delivery was requested. But... before production could begin, extra copies of each customer-print were needed. Being extra-expensive,



these prints could not be used as print-making masters in Kellogg's direct-process machine. How, then, could the extra copies be obtained in the shortest time... and at the lowest cost?

Kodagraph Autopositive Paper was the answer.

Now... extra copies are made quickly... economically.

With Kodagraph Autopositive Paper, Kellogg reproduces the blueprints, direct-process prints, and other types of "originals" directly... quickly obtain the print-making masters that are needed so urgently.

The operation is simple... is performed under ordinary room light. Autopositive Paper is exposed in contact with the customer's print in Kellogg's direct-process machine. It is then processed in standard photographic solutions. The result is a sparkling, long-lasting, highly legible photographic reproduction—clear blacks, clear whites—on a durable, evenly translucent paper base. From this Autopositive intermediate, the required number of extra copies can be turned out... at practical, uniform machine speeds.

Kodagraph Autopositive Paper

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- It reduces old, worn drawings... reproduces originals.

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ENGINEERS' NOTEBOOK



HEATING SYSTEMS

V-BAND COUPLINGS

simplify assembly and maintenance

Marmar V-Band Couplings connect tin valves and expansion joints of the Douglas C-124 Globemaster II anti-icing and cabin heater. They withstand a temperature range of -55°F to 450°F with an operating pressure of 25 p.s.i. Marmar sheet metal flanges welded to the ducts provide a quick, economical seal and the quick coupler feature of the coupling latch speeds assembly and disassembly.

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STANDARD CLAMPS FOR SPECIAL APPLICATIONS

ing on a total of \$125,000 a month in precision astronautic and engine assembly parts, but believes the show was a good start.

Contracts with sales can be agreed within two or three weeks after study of their production capabilities.

► **Detailing jobs**—By the end of the week over 500 visitors had seen E-P's display of 60 parts. Components were broken down to show individual parts and each was accompanied by a tag listing the machine tools necessary to do the job. Also available were blue prints and operation analysis sheets detailing the methods the prime contractor uses to make each part shown. At least a half-dozen employees, acting as shop foremen, were on hand to introduce prospects, explain the problem and make up a lot of likely questions. Exhibits were precision gears, rakes, shafts, cones and pins and the tool equipment needed to make them.

Visitors came from the Newark area, Long Island, Philadelphia, New York City, lower New England and upper New York State. An Esplanade-Pennsylvania spokesman commented that in most cases, the prime's representatives had to draw out visitors on their potentialities, which indicated lack of familiarity with the product.

Many were believed to be consumer goods manufacturers.

► **Whole Products**—The company already has an established program for giving other firms to make complete units. Eighteen glands were fabricated using products for E-P. Now E-P is completing parts subcontracting to find the home plant. Prior to the show it had approximately 45 jobs.

Gear Output Speeded

A new straight-line automatic loader permitting clearing of all gears of a two-three or four-speed gearbox automatically by a battery of Rod Ring Druggist Drilling Machines set side by side, has been developed by National Brush & Machine Co., Detroit, Mich.

A single operator runs the setup. He simply supplies cutters and pins to the machine head of the first machine and picks up the completed gears from the discharge chute of the last machine. All handling between is done by automatic transfer. Cutting cycle also is automatic. While all machines are in operation, each may be operated in a clockwise or counter-clockwise direction. No appreciable time is lost because of difference in machine cutting time, says the firm.

An automatic gate at the feed entrance of the first machine prevents accidental entrance of any foreign gear which might damage the cutters. Also operation stops automatically if the discharge chute becomes completely filled

U. S. Navy's A2D Skyhawk equipped with Aeroproducts dual rotating propeller



Aeroproducts

dual rotating propeller converts power of the T40 into maximum thrust

Aeroproducts efficiently harnesses the tremendous power of the Allison T40 engine in the U. S. Navy's A2D Skyhawk. The result? Flashing, near-sonic speed, pierce, climb and performance possible to date only with this great turbo-prop power and Aeroproduct combination.

Years of research went into this amazing engine and propeller combination. Yes, years of research by some of the finest aeronautical engineers in the country—the men at Aeroproducts and Allison in cooperation with the Navy, which provided our Navy with a new and vastly more destructive weapon.

As a result, Aeroproducts is now preparing to deliver on the first production order starting for Turbine propellers.

Aeroproducts engineers are available for consultation if you have any propeller requirements in the subsonic, transonic, or supersonic range. Aeroproducts—backed by the full facilities of General Motors—will be glad to serve you.

*Building for today
Designing for tomorrow*

Aeroproducts



AEROPRODUCTS DIVISION
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DAYTON, OHIO

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USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command:

Avionics Products div. General Motors Corp., Warrendale, Ohio, studies for production of precision controls and actuators, over \$100,000.

Avionics div. General Radio & Electronics, N. Y., photographic aerial film, 100,000 sq. ft., over \$100,000.

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EQUIPMENT



BUSY MAINTENANCE STAFF serves DC-16 in Pioneer's rubber-lined hangar.

Ingenuity Beats Local's Problems

Pioneer finds shorthaul, gear-up gear-down operation presents passers, but fresh approach can lick them.

By George L. Christian

Dallas-Alexie competition with railroads is usual—competition with auto airlines is something different. But when Dallas and Alexie competition is Pioneer Air Lines, the nation's oldest local service passenger carrier.

Pioneer is almost literally operating a flying bus service in an area where such service is unprecedented. Pioneer's average length trip is a journey gear down 77.5 mi taking 29 min. Shortest hauls are Dallas-Forth Worth, 10 mi and 12 min flying time, and Waco Temple, 33 mi and 15 min flying time.

✓ **Yield of Endurance**—And the frequent landings and takeoffs subject its fleet of 13 DC-16s to a grinding endurance test demanding top-top maintenance. Merely at the carrier's success is a current operating fleet of 99.63 and a daily utilization of 7.53 hr.

Pioneer's type of feeder operation offers only a 16 hr flying day instead of the 24 hr flying day available to coast trunk carriers. If B. Seifert, vice-president of operations, told Aerovision West, Kansas is that most of the airline's customers do not require transit position in the middle of the night. And a utilization of 7.53 hr out of 16

hr, extrapolated to a 24 hr flying day gives a utilization of 11.45 hr.

Pioneer also performs such scheduling gymnastics as having a doorway connection at Alexie, Tex., in four directions, while average ground stop time is two to three minutes.

✓ **New & Different**—Kynette of Pioneer's executive offices, operations and maintenance headquarters at Love Field is a repository of thought and experience. Some of the many ways this is expressed:

- **Complete** use of overhead and maintenance facilities. These include complete garaging and tagging facilities—some of the largest airline maintenance bases left the States.

But, paradoxically, here is an airline that does not overhaul its engines (in fact it does not take out of service any). Pioneer has such a large supply of new engines, it usually a new one at every engine change. Old engines go into storage.

- **Immediate cleanliness.** There was not one oil spill on the hangar floor when the fire inspector inspected the layout.
- **Employee safety.** Pioneer officials say that, to the best of their knowledge, there has not been a single accident among the employees at their years.

- **Rubber-lined hangar.** Pioneer built its own hangar provided with rubber lining. This has great benefits, even heat. Another advantage was discovered last winter when a plane, fully loaded with passengers, mail and cargo, suddenly fell up before it reached clearance for takeoff. It was tossed, passengers and all, into the rubber hangar. In ten minutes it was cleared of ice. It seemed there was the pilot and passengers to take off which he did without trouble with his worn plane.
- **Propeller storage is simplified.** No chance no longer lost time along on long-stored props. Old and worn engines, propeller parts, which to be stored, and longer boxes, provide ideal supports for spare props.

- **Oil system cleaning** speeded up. A redesigned, hand-operated and roller cleaner, capable of handling two units simultaneously, has expedited the job and relieved the oil water storage. Unit continuously rotates the two engines while spraying a steady stream of cleaning fluid through them.

- **Safe hangar and airfield.** If a hangar once stops while a mechanic is stretching it, it can look an arm. To avoid such accidents, Pioneer built a hydraulic jack on top of a 4-in. thick old steel beam being replaced. When the cords are pulled to desired length, while mechanic works in safety.

- **Cylinder head-mounted** propeller governor control cable pulley assembly was developed by Pioneer. The unit weighs considerably less than the original design and has had 15 engine runs with out failure. Alexie's wheels eliminate metal-to-metal contact and resultant vibrations.

- **Pilot and cockpit** have local operation in the cockpit, land and use available as standby equipment.

- **Educated** and pipe extension over the office several times have formerly appeared in clearing exhaust stacks from under the wing.
- **Face-lifting extension.** Headlight adjustment gears of Pioneer's DC-16s run in parallel lines fore and aft on the side giving a new and maintained line of sight and unimpeded interior view.

- **On-the-job mechanic training.** Engine mechanics are built up by on-the-job training mechanics. R. L. Sirek, Pioneer's superintendent of engineering and maintenance, and this is a good training program for the men and reduces cost of giving the work to outside contractors or overloading the technical staff.

- **Simple drawing.** DC-16 is simple when painted under pressure with a Pioneer-designed connection of Ross Air and Vans.

And ingenuity does not stop in the maintenance shop. Hangar men to and aviation building plans were held

PRESENT & PROPOSED ROUTES • PIONEER AIR LINES, INC.



BETTER LOCAL SERVICE would be result of granting additional routes. P.A.L. says

out by Pioneer personnel. An architect drew the plans from their suggestions. Besides are modern, functional and efficient. No window was included since they are "only made to look out of." The executive offices are built around a central pool to promote flexibility.

In the Link-Traffic room, type of ceiling of GCA buildings are used into the tower to keep pilots located on latest blind landing techniques.

A company industrial cafeteria offers employees reasonably priced meals.

Pioneer has suggestions to become a business building some day, do off with us. But it does want to enlarge its route structure (see map) to give better service to its area.

On big and unexcused problem working Pioneer engineers have at the moment a what kind of equipment can do the job it wants, faster and more economically.

Non-Pressure System for Seating Windows

A sample method of installing windows on L-10B Constellations, which illustrates the effectiveness of Pioneer's new system for seating windows, is shown in the photo to the right. The system was developed by Capital Airlines with the blessing of Lockheed Aircraft Corp.

It involves the use of a special vacuum plate which is applied successively to each window port on the outside of the plane to "vac" the inner (pressure) window into its mounting, instead of pushing it into place as is done in pressure systems. The device was developed by Al Bellet, the airline's instructor in air conditioning.

✓ **Even Stripes**—Prior to Bellet's plan, Capital had to guarantee the entire cabin—other airlines still are doing—so as to seal the windows tightly and evenly on the mounting before applying the vacuum system. Lockheed's method involves no operation to the effect about six months ago, after it became convinced a number of window failures

were the "blowouts" in flight were the result of vacuum stresses on the inner panel caused by improper sealing and application of vacuum. With pneumatic, it is believed, even could be tightened on a more already correctly aligned in a line and on the mounting, then eliminating "blowouts" and consequent stress on the window.

While pneumatic sealing is the best, it is more expensive and time-consuming than the new method, necessitating removal of the plane from the hangar and raising up the engine. Capital says an even more required in the cabin to get windows in place. And speed was of the essence, because temperatures sometimes rise to an uncomfortable 120° F in the cabin, Capital says.

The new system allows windows to be changed or repaired separately, doesn't require a large crew, possibly work to be carried out in the hangar and eliminates engine run-up.

PASTUSHIN DESIGNS and MANUFACTURES

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AIRCRAFT SEATS

for military aircraft—stressed up to 40 G's. Can be designed and built to your specifications.



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WITTEK FB38
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WITTEK FB40

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Made of stainless steel and made in all standard aircraft sizes. Also featured in the book "The 12" for fast, reliable, efficient applications. Features easy to determine when hose is in place.



Must conform AIA specifications and have C.A.A. approval.

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TEST house for J33, J35 and J47 jet engines designed and made by Jinks in



TRANSPORTABLE by air in one DC-4. Initial AF reports attribute big saving in time and money to new package test unit, shown bound and made for shipment.

New Jet Tester Speeds Overhaul

AF reports easier maintenance, lower costs in field; unit can be broken down for air-shipment in a DC-4.

A new jet engine test cell recently put into service by the Air Force has enabled overhaul lines to speed up and cut costs in trouble-shooting and overhaul timing of turbojets.

The test cell can be drawn and quickly and brought by air. It reportedly permits rapid checkout in minute detail of all U. S. military turbojets and related ignition systems now in use. At advanced bases, it has proved out a number of Jinks in jet maintenance activities caused mainly by previously limited facilities.

And, according to AF, it has dropped maintenance costs impressively. One unit, Nanchang AFB, Germany, at tributes savings of nearly half a million dollars to the cell in the few months it has been on the trouble-shooting and testing job there.

Aviation Club—Developed by Jinks and Co., Inc., Hickensville, N. J., eight of the cells have been built for the AF and one for the Navy. Jinks believes

it will meet needs of the aircraft when they turn in again. Among attractive features listed by the firm, a gaging tool enough to fit engine portbooks, a manual system system test rig—one of the best test procedures encountered in developing the cell—that can be used for checking a wide variety of jet system systems and starters.

The cell is in four parts—a test bed on which the engine is mounted, a terminal box to which engine leads connect, fuel supply tank and a control house. The installation is self-contained except for fluids required and an electrical source of electric power which connects at a central point. The complete rig can be disassembled, quickly, easily and shipped in a plane each in two DC-4s.

RapidFire Turbo-test rig at advanced bases, the installation boasts production line efficiency to streamline overhaul, cutting in a maximum the time used in moving and returning critically

YOU CAN BE SURE... IF IT'S
Westinghouse



As twin engine fighters for the Navy's newest carrier-based jet squadrons are powered by the J-34. This light and slim Westinghouse engine lends itself ideally to a twin engine installation which in turn provides the reasoning safety factor of single engine operation in times of emergency.

The designers of these airplanes chose the J-34 because it combines high power with low weight. These features plus the power, dependability and performance of the engine assure that the vitally striking force of the United States Navy will be second to none.

24400-1

Westinghouse
AVIATION
GAS TURBINES



Parker makes all these

AN 6227 and AN 6230 Hydraulic

- RINGS

5427 and 5430 High-Quality Industrial

- RINGS

AF-936 Fuel Nozzle

- RINGS

AMS 7370 Fuel Service

- RINGS

AMS 7374 Oil Service

- RINGS

AN 6260 Fitting Gasket

- RINGS

Special Service

- RINGS

and ONLY
Parker
makes them ALL
...every kind! D-ting
...every size! ...every
...every type! ...every
...every material!

...and ONLY Parker has:

- most complete manufacturing facilities
- most thorough compound formulations
- most extensive research facilities
- strictest quality-control processes
- most exacting inspection and handling

Popularly used O-Rings stocked by authorized distributors in principal cities. Special Service O-Rings of tested and approved compounds supplied on order. Write now for new Parker Catalog No. 5100 which includes complete basic data on O-Ring sealing.

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Plants in Cleveland—Los Angeles—Elms, Ohio—Baton Rouge, La.



ALTITUDE chamber, developed by JACO and Cowper, tests engine and quality of aircraft components. Unit sets up highly explosive atmosphere.

needed jet engines to service. And it probably reduces the number of parts required at a base. It can be used for rapid-order trouble-shooting of malfunctioning jets and for speedy, step-by-step checkout of every facet of operation of newly overhauled engines. Faulty parts can be removed and replacement parts checked while the powerplant remains on the test bed.

According to Neuhoff AFB, before this equipment arrived, an overhauled engine had to be put back in the plane to be tested. If the overhauled engine operation, it had to be pulled suddenly out of the aircraft a second time, etc. Now, bulky turbojets are rechecked to the cell until they learn to behave properly.

Neuhoff says it takes 17 men, for three jets to pull an engine from the right fuselage of an F-84E Thunderbolt and move it on the test bed. Lines are run from every outlet of the jet to the terminal box. The engine dies in run, firing all test phases from the sound-proofed control house. This shifter is made of aluminum alloy.

JACO says the standardized, rapid fix techniques allowed by the cell permit an overhauled turbojet to be tested through all tests in less than an hour, compared to the 7-10 hr. required for checking out overhauled piston engines. The cell is built so it can be converted readily to test two jet engines simultaneously.

Special, Lowcost Cell-Jet engine repairs are long on experience in design and facilities of this type, dating back to World War II when they worked under the name of Jacobson & Co., forerunners of the present firm. Among today's recent designs is a compact, low-cost test cell package for the fixed-time operator. The installation is relatively small and covers completely equipped to check out engines. It is fitted with overhauled cylinders—another JACO

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specialty—on both engines, and initially to design some developed during the engine tests.

A late development of the firm is a heavily beefed-up altitude chamber in which highly explosive atmosphere can be injected to test explosion proof quality of various aircraft components. Even though the component may not trigger an explosion and stress possibly dropped, the operator still can double check by spiking the chamber positively to set off a black-smoking crown on explosive atmosphere was carefully set up during the test.

Finally, the chamber can put an engine in its service. The test can be observed through windows in the unit.

Triple-Duty Unit Services Engines

New engine service machine is designed to fill a three-fold need for engine maintenance requirements. Glen Hydraulic CR-100 will use three functions.

- Clean, flush and jewel jet and recondition engines and lubrication systems components removed from engine. Machine can also do the necessary repairs engines and components for storage.
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- The best oil to make cold weather engine starting easier.

The equipment has two self-contained systems each provided with a reservoir, pump and motor, filter and interlocked safety switch. Each reservoir is provided with high capacity electric heaters. The CR-100 may be equipped for trailer bed mounting, or even mounted on wheels if desired by the purchaser.

New Seats For Convair 340

A contract covering manufacture of all the passenger seats for the new Convair 340 has been granted the Hamilton Tool & Engineering Co., W. Los Angeles.

The Convair seats were designed by the aircraft company. This is said to be the largest passenger seat contract to be awarded by any airplane since inception in the period of the last four years.

Production on the new seats is to begin this fall and extend through the spring of 1955.

Hamilton, according to data of over 25,000 airline passenger seats, is now producing seating for Lockheed 1049 Super Constellation and Douglas DC-6Bs.

NEW AVIATION PRODUCTS



Tough Aircraft Nut

A tough, slotted, self-locking nut that can be used on aircraft, landing devices and is designed for applications where temperatures run up to 700 F., is being produced by Kayser Mfg. Co. Designed to meet specifications AN-N-34, the nut is lower in weight and lighter in weight than any similar nut of comparable performance, the company claims. Of simple, one-piece construction, it is fabricated from high carbon, annealed spring steel in a low cost process on high production stamping equipment. It is stamped, tapped and crimped in the annealed condition, then heat-treated, plated and finally given additional tempering.

According to the company, the product is an extremely strong flexible threaded portion which uniformly gaps the bolt without screwing anything locking device. It adds that a slotted oriented series of bolt sections and materials can be made without diminishing the locking action or forming threads in the nut. The part is available in 1 in. solid anchor, floating anchor and gang clamp types, and is expected soon to be available in sizes ranging from #5 to 4 in.

The Kayser Mfg. Co., 820 E. 16th St., Los Angeles.



New Limit Switch

A new limit switch, designed especially to operate under adverse conditions in aircraft, has been announced by Electric-Snap.

The switch can be used for radiation shield of landing gear assemblies,

fuel control, movement and interlocking of bomb bay doors, inert operation and similar applications.

The complete unit is hermetically sealed with an airtight atmosphere, protecting it against freezing, corrosion, explosion, accumulation of dust on contacts, loosening and misalignment. A tipping dampener action (no shattering parts) helps prevent movement from interference on the outside of the unit. Performance is equal at sea level or 99,000 ft altitude, up to the limit.

The switch is a double-throw, double-throw type with nearly instantaneous breaking of contacts. SPDT models also are available. The switch is reportedly built for long life, weighs 3.5 lb., measures 2.5x3x1.5 in.

Electric-Snap division of Ebbett Supply Co., 4215 W. Lake St., Chicago.



Weight, Time Saved

Aircraft "Lark Bolts," weighing 16% less than equivalent AN bolts, commonly used, are now being produced.

The new two-piece fasteners, consisting of a pin and collar installed by a special pneumatic tool, are designed not only to save weight, but to speed assembly substantially. They can be installed at least twice as rapidly as conventional bolts and nuts, says the firm.

Strength of the bolts is reported to equal or exceed that of standard AN bolts. Also, hole tolerances for an interference fit are greater, eliminating reaming, staking the outcrop. Clamping action of the new fastener is strong enough to pull together sheets separated by a gap of 1 in. They are made

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Cherry Road division, Townsend Co., 211 Winston St., Los Angeles 33



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Hydraulic test stands, built to customer's requirements, for checking of flexible hoses, valves, cylinders and other components used in aircraft, are available from Superelastic Corp.

The stands normally provide pressure up to 5,000 psi, but this can be reduced to 50,000 psi with special booster equipment. The test rig can be modified to include accelerometer or cycling equipment, timing devices, etc., used to employ any type of hydraulic oil. They incorporate pumps, relief valves, oil separators, electric motors, flexible couplings and incidental piping and piping to meet specific test purposes.

Superelastic Corp., 14235 Wilshire Ave., Detroit 4

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AIR TRANSPORT



CREATED by Mexico's President Alemán (striped suit) are George Van Nstrand, AA president's left, vice president and general manager of American Airlines de Mexico, AA president and board chairman C. R. Smith (the Alemán's right), and other board members.

Mexico Meeting Earns Goodwill

Officials south of border roll out plush carpets and pay high compliments to visiting AA board of directors.

By John Wilhelm
McGraw-Hill World News

Mexico City—American Airlines' publicity war front office pulled off a real coup recently when it drew all available members of the board of directors to Mexico City for a full-day director's meeting—and thereby pulled down not only first page stories but special editions in the Mexico City press. Mexico City is located at the heart of AA's continental net.

C. R. Smith, president and chairman of the board of AA, leaves a good publicity idea when he turns out. When his publicity expert, Rex Smith, as AA vice president, proposed the Mexico City meeting as a link to draw headlines to itself as goodwill from Mexican officials, the airline boss gave him an immediate green light.

On Page One—Cue Mexican papers to a special 11-page edition filled with stories of American Airlines' speediness and luxury, as well as with pictures and his history of all the members of the board. The biggest dailies in the capital trumpeted the story of the "board meeting" and President Miguel Alemán greeted each director personally.

There also were several other interesting angles to the stunt. For one thing, it gave the directors a chance to see the Mexican leg of AA's network first hand and to see where American is going to pour over \$1 million in facilities this year, ahead of stepping up the already booming Mexico tourist business.

One of American's important accomplishments in Mexico has been improving relations with the Mexican government. (Very important in a country where the U. S. airline, Eastern and itself, have found the door shut in their faces.)

Head from America—it is not easy for a U. S. business concern to bring its top men down and make sure they get an audience to the Mexican White

House, Los Pinos. American did it by having among the officials of this Mexican subsidiary, American Airlines de Mexico S. A., some very influential Mexican strong-arms.

Alemán shook hands with all present, and then one of the powers in Mexican politics, Lic. Alejandro Gariño, Secretary General of the Federal District, gave the AA board a formal speech at a luncheon (well covered by the local press and photographers) at which he told Mexico didn't want all types of foreign airlines, but that it welcomed a company like American Airlines. That is the mark of top-drawer public relations in our country.

"American Airlines is a company of goodwill," Gariño said in a Spanish-language talk, "and as the type of company we want to have in Mexico. I personally wish to state that man like Van Nstrand (George Van Nstrand, AA Mexico head), Smith (Rex E. Smith, AA official) and William Gould (on the board) are gentlemen who we respect with esteem and appreciation for their honesty, trustworthiness, and high principles, both personal and business."

►No Adversaries—"Mexico is a poor and weak nation," Gariño went on, "and needs now to protect itself from the type of advertiser arriving here with the thought of blinding our country. Mexico does not need to desire to receive such advertisements."

"On the other hand," he continued, "there are the invasion of good faith, ready to accept their right to do so, and to accept the type of advertising that we want. Of this type," Gariño concluded, "is American Airlines."

With such a real-off and with the knowledge that the Mexican government is giving all the necessary facilities for the first time since it was started in 1942 the board would feel the trip well made. Until this time AA has been getting no money in the belief that the door it had been shut so it couldn't possibly come. The day seems to have arrived.

Compiling facts with the honored words from Mexican officials, a letter like AA has a long history in Mexico. The 10 directors appeared to be convinced at just that as C. R. Smith noted they all felt to Mexico's airlines Pacific give part of Acapulco for the weekend before returning them to their desks in the States.

CAB Gives New Life to Air Coach Fares

Passent low fare air coach prices will remain in effect at least until Mar. 10 of next year, the Civil Aeronautics Board has decided. These fares were to expire Dec. 10 of last year.



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The World's Scheduled Airlines

	TOTAL	4-ENGINE	2-ENGINE	1- AND 3-ENGINE
World Total, 1951	3,839	990	2,561	279*
U. S. Owned, 1951	1,218	300	668	19
Foreign, 1951	2,621	690	1,893	260
World, 1948	3,775	942	2,498	385
World, 1949	3,643	932	2,356	355

*Includes all three-engine planes (Pitts, Route and Lockheed) and 128 aircraft without fixed seating.
Source: World Aeronautical Index, Bureau of Aeronautics report, "Progress of the Foreign Scheduled Commercial Carrier Industry," August 1951, p. 108, L. 1951

World Flies on American Wings

Of the 3,839 transport planes operated by 217 scheduled airlines in the world, American manufacturers built and sold 80%. Douglas Aircraft Co. alone built 56% of the world's airplanes. Of the 23% not made in the U.S., Boeing built 13% and Armstrong, Glendon, France, Germany, Italy, Peru, Sweden and Russia the remaining 7%. This analysis is a 25-page statistical review of all the world's airlines, put out by the Foreign Air Division of the Civil Aeronautics Board. Title of the statistical summary is "Equipment of the foreign scheduled commercial carrier airlines."

Part 1 of the tabular report details numbers, manufacturers, model and wing arrangement, and date of introduction for key foreign airlines.

Part 2 talks of the routes and airlines, but less than by model, country of manufacture, number in

service, number of engines, type of plane (for example, "land biplane") and by standard seating of the model (which then by seating is installed by the individual airline, as in part 1).

Part 3 lists planes by geographic regions, nationality of airline, country of manufacture and number of engines. This section includes U. S. planes as well as foreign, for statistical comparison.

Four scheduled airlines are left out of the summary—Rena's Civil Air Post Administration, Hungary's Minszket, Argentina's LAESA and Peru's TAP. Two military agencies flying scheduled service.

Not given this year is number of scheduled transport operating in the world was 58 planes or 1,876 from 1,775 planes in 1948.

Copies of the report are available from CAIP's Publications Section.

between and airlines are expected to support the new CAB proposed requirements generally, although they may disagree with some of its minor details.

The original proposal (Aeronautics Week Sept. 17, p. 44) was called "industry" by manufacturers because it required "clear and distinct stall warning at least 7% above stall speed." The new CAB draft scheme (No. 11) issued by CAB Safety Regulation Director John Chamberlain would require:

"48-162-stall warning. Clear and distinctive stall warning shall be apparent to the pilot with sufficient margin to prevent inadvertent stalling of the airplane with flaps and landing gear in all normally used positions... other than the inherent aerodynamic qualities of the airplane, or by a device."

A note explains what "indefinite" stall warning may be. It says warning 7% above stall speed is one criterion (the other proposed regulation required warning at least 7% above stall

speed). The note says "other margin may be acceptable depending upon the degree of clarity and distinctiveness of the warning and upon other characteristics of the airplane evidenced during the approach to the stall."

► No Warning Device—For America, among other Stinson-type aircraft, has been having to get permission to remove the spoiler. Only painted gear will be sought of spoiler installation.

As for stall warning, the Boeing Stinson-type already meets the requirement of the old proposal in many respects of warning "the pilot 5% above the stalling speed." Then first, another Pan American jet Boeing planes to test the Safe Flight Instrument Co.'s possible warning device on a Stinson-type, although it had earlier been reported that they had placed such an installation (Aeronautics Week Oct. 15, p. 64).

CAB Sets Causes In National Crash

Probable cause of the National Air Line DC-4 crash, Jan. 14 at Philadelphia airport, fatal to seven, was "the airplane's error in judgment in landing the aircraft too far down the slippery runway instead of executing a missed approach procedure," CAB Aeronautics Board reports. Investigation tracing a also cited.

But possibly contributing factors are listed as the matter:

"What was the pilot not to see the final tower message that talks of poor visibility landing conditions on the snow-covered runway, although the tower's

tape recorder shows the message was transmitted. CAB says "had this information been given to the flight when it first contacted Approach Control, additional time allowed would have permitted the captain to make a better evaluation of the field conditions."

► A 5-gale (gale) was reported. But CAB says that "the pilot had no way of knowing on the approach to the runway that this severity was not needed to effect a safe landing."

► The pilot says he properly made a slightly high approach "to avoid possible landing hazards," but "intended to land in the first third of the runway."

Wheel marks showed wheel contact was made by the main landing gear 3,340 ft down the runway with only 2,140 ft. left to go, report shows. Company DC-4 operations manual says the plane needs 1,530 ft. to stop even on a dry, 6,500 ft. as a wet or icy runway.

The Board says that the pilot would have seen the ground at 500 ft. altitude over the middle runway during his instrument approach, and that as he approached the runway he could see the green threshold lights and all the runway lights. Board adds: "His decision to land at a point, which even under favorable conditions would be considered marginal to allow stopping does not reflect (good) judgment."

CAB also traces the cause to the current decision could have been made more probable by additional training... Although the training program complied with the manual... The use of the type of the air carrier is provide additional training... No rule can be promulgated which will provide for all contingencies.



'ISLAND LIGHTS' FOR AIRPORT RAMP

Down reflector lights mounted on pipe standards similar to those used on runway stripe pump schools, provide high accuracy illumination for passengers and ground personnel at Atlantic City's new airport. Airport's new administration building. All

light is reflected down and does not cause control tower personnel at control points. Lights on 14 ft. high, speed 18 ft. speed. Floodlights show on building and support tower lights, will be visible to see for light to make ramp.

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MALTESE CROSS indicates ownership of this BM:2, but not nationality of its owner.

Italy's Phantom Military Airlift

Military Order of Malta owns the transports, but they are based on Italian fields and flown by Italian pilots.

Race—A new type of "privacy" program—with short, strong strings attached—is being sponsored by the Italian government to assess the usability of a military secret: strength larger than permitted by treaty limitations imposed by the Allies.

According to tests, the Italians on shore may have no more than 350 tons of port and training planes out of a total of 400 of all types. But purchases from Britain and arms sold from the U.S. would make this former figure show Italy's quota unless some still airworthy transports in the Italian aircraft were destroyed.

The thirty Bolsons quickly figured out a legal loophole that would solve that problem, let them get new planes and for all intents and purposes still have the old ones.

► **Governors**—The "gave" the places they would have had to devote to the Sovereign Military Order of Malta, a nonsectarian religious order without subjects or territory, whose diplomatic representatives are recognized by a number of European and South American countries.

The order now does charity and hospital work. During the war its four hospital trains were seized by the Germans when the Italians withdrew from the fighting.

The Order of Malta frantically had been petitioning the Italian government to have its property restored until an Italian Air Force Staff officer, a member of the Order who was aware of the problem, the Air Force was forced to

...the matter of destroying the transports, but upon a novel solution. Why not meet the Order's claims by substituting the doomed transports for the train it had lost?

► **Is Nuke Only**—This the government accomplished by signing a contract with the Odrav giving it 30 SMI-Merchets SM-82s, 2 SM-75s and 4 Fiat G-12s, stipulating however, that the

planes be stationed at military airfields and be handled by Italian military pilots and crews. Although the Order now has its white cross insignia on the planes, it must make application to the authorities before using them.

To convince any skeptics, a group of four of the artists were used a month ago to fix 50 Irish medals from Dublin to Lourdes.

Since the convention was signed, the Order's active war members own 180 aircraft—nearly one-quarter the size of the Italian Air Force—and soon some CANTZ-105 flying boats will be added to that number.

The Allen have been kept fully informed of the negotiations and throughout the deal on land.

Instrument Approach Time Is Improved

The average delay time on freeways approaches the first half of first year in use minutes and 23 seconds—a 7 second or 5% improvement over a year ago, Civil Aeronautics Administrator C. F. Hove reported in a speech to the Los Angeles Chamber of Commerce on future plans and policies of CAA.

In that place-and-policy talk, Horne restated what he says has always been the CAA policy. Horne said:

"CAA has only one basic policy, which guides all our efforts, and that is to encourage and help the development of safe, useful machines."

He cited the enhanced airport delay time as instrumented weather this year as an example of CAA work toward that policy. Elmore noted several of the detailed contributing factors to the 20% improvement in gate turn-around time.

- Start of direct talks communication between most CAA air ports traffic control centers and the pilots controlled.

- Start of radar use for traffic checking and control
- Better traffic patterns
- More concise voice procedures for both air and ground operators

Air France Places
U.S. Avionics Order

Air France has placed a fleet order of over a half million dollars for VHF navigation-communication equipment produced by Collins Radio Co.

This is by far the biggest single order placed for U.S. airborne emergency sets (and associated VHF facilities), according to Collins.

The equipment includes 170 analog-to-digital converters (250 channels, type 51B-1), 130 pulse-to-digital converters (20 channels, type 51V-1) and accessories.

Delivery is slated to start in May, 1912, and be completed by July.

The order does not necessarily conflict with the French Air Ministry's declared intention to adopt the British Decca System of air navigation, already partially installed in Northern France. Air France points out its ocean transponders eventually must have VOR equipment to approach airports in this country anyway, and it believes there will be enough of these ocean linkups as France built the U S to keep abreast into that country.

The vocal encouragement system is an interestingly conceived recently as the latter system, studied for an assignment by the International Civil Aviation Organisation, without entirely shutting the door on the Docos System. In effect, the dispute between advocates of both systems is still far from ready to be taken up in forthcoming meetings, but the reports of the world's airlines, including Air France, have supported the VOR system. Britain, specifically British European Airways, has been the leader of the forces in opposition to the other.

Air Coach Idea Grows in Australia

McCauley, J.H. World News

Melbourne—Queens Export Airways is considering placing Ansett Airlines in offering Australia as coach service. Queens' action probably depends on the outcome of an Atlantic flight trial next year.

And it is understood that some other Australian airports are considering the introduction of something similar as a precaution against the decrease in passenger traffic which may be caused by further increased fares. The second class air travel would mean more passengers per aircraft, but specialized ser-



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What's Going On? Plenty!

(Just back from a field trip, talking to all levels of aviation circles between executives on either side of a desk piled high with letters from military, industry leaders, staff members and reports, and then to be here personally here in New York headquarters still at last, digging and writing. What's going on in aviation? Plenty, as always. Here are a few important ones current readers in talking about.)

In big news bearing in the Air Force's industry people everywhere are asking. This is the circumstantial as above.

Gen. Wolfe resigned to accept a top spot with a Swiss firm involved in armament production. Coinciding with this is a strong rumor in Dayton and Washington that the Air Force will have its own armament instead of continuing inter-service procurement through Army Ordnance.

Gen. Hagline, Shepard and Quade all resigned to enter industry, accompanied by some newspaper notices of disaffection with high-level policies. Gen. Chaffee was replaced as AMC head by Gen. Harvillings. Gen. Swafford—with engineering background—was transferred from WADC to the Air Force Institute of Technology. He is being made to stand in a corner, a la Gen. Clegg's Col. John G. Selman, now deputy to Gen. Scott, Chief of Procurement, but as Inspector General background more recently than his procurement experience.

Undersecretary McGowan resigned. It is said reliably that he agreed to help Secretary Friedman only about a year. Gen. Kinney retired, but opinion is uncertain that this was a logical and expected event; he hasn't gone into industry, however.

Two persons were pardoned for alleged irregularities in conducting Air Force business at Dayton—one a former USAF buyer, the other a representative of two major electronics firms. A congressman says inquiries will turn up more incidents. So far, American West's audacious questioning in Washington, Dayton and elsewhere brings to light no trace of links that might be any of the events above into a single story.

We have the unanimous answer that (1) The splitting off of USAF research & development from the Air Materiel Command was a bitter pill to AMC; and (2) These high officers hated above who entered private industry did it for the additional income, under pressure of the ever-increasing inflation.

Complexity or Simplicity?

Tooting the industry you hear but cannot verify the report that there is a new fighter or aircraft proposal out with the performance data left blank. Instead, the idea is stated very simply—to exceed the best efforts of the MIG-15.

You hear in the field and from your staff reports that these who have seen the wreckage of that captive MIG

—and it is real wreckage, indeed—are surprised at the superficial planning that prepared the design for production, so that untried labor in large numbers could turn out a creditable job. Surprising still how thoughtless economies in labor and materials in carefully chosen schemes where shortcuts will not impact the overall strength or performance of the craft. In some respects, it's the Japanese theory of simplicity all over again.

Superior performance is won by weight cutting, and close design unencumbered by gadgets, protection for the pilot, complex and over heavier equipment, wing-tapering, strength items.

Some would like to say it's merely a matter of Russian extravagance of pilots whereas we want our pilots back and back safe. It's not so simple. Somewhere there must be drawn a line between the Russian simplicity and the American over-extravagance of weight factors. Some of the top executives in our aircraft industry are deeply worried about the Air Force's continued trend toward more and more weight.

Somewhere, we must stop the trend and take realistic stock. We cannot forever put more weight to more power or we may make up some reasoning to find ourselves greatly outdone with a better MIG, with a great deal less power than we ourselves are digging around under built-in burdens. What our presentist does glibly, the other designers talketh away.

Paper Work Is Bugged Down

You hear everywhere that the Air Force is lagging woefully in its paper work, and descending always more. It's not uncommon to hear that entire lines of products have been proposed, designed, manufactured and delivered completed, with no contract yet. This is tough on big firms, it's sometimes next to disastrous for small business. You hear everywhere that government, for all the good words in Washington, is making it next to impossible for small business to exist.

And everywhere you hear that government—including the Air Force—is becoming so big that it not only doesn't know what its respective hands are up to, it doesn't know how many hands it has, and it is constantly being surprised at discovering a new one. Obviously, they impede each other.

Government's cumbersome bigness is a subject of bitter suspicion even for aviation manufacturers, who have always had more than their share of short notice demands, countermanding orders, and over-riding change orders. Government checks into industry privately that if we were not trying to have both our goat and better too, they could act more decisively. Maybe so, but that's not the whole story. Much of it is sheer bigness.

—Robert H. Wood

(The second of this series will appear next issue.)

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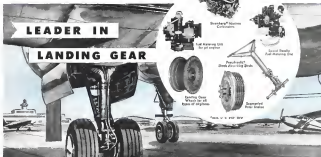
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